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FLY ASH FROM THREE GENERATING STATIONS IN ALBERTA

by

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MICROMEDIA

1. Introduction

The purpose of this work was to obtain samples (approximately 500 kg each) of fly ash from three coal-fired thermal generating stations located in Alberta:

Wabamun G.S. - Wabamun, Alberta

Sundance G.S. - Wabamun, Alberta

Battle River G.S. - Forestburg, Alberta

The samples collected were representative of the types of material that could be available for use in concrete and were collected under controlled conditions. In addition, the following compilation of information relevant to the production, collection and management of fly ash at each of the plants was made.

2. Plant Data and Details of Ash Sampling

Table 1 presents a summary of the generation capacity, coal type, coal consumption and ash production data for each of the three plants. It should be noted that, where these data refer to future estimated coal consumption, changes in demand for electrical power may cause considerable deviation from the predicted fuel usage and ash production.

A new generating station has recently been commissioned at Keephills (TransAlta Utilities). This station will have a final capacity of 750 MW (1985). Details of the projected coal consumption and ash production from this plant and others proposed for Alberta are given in Table 2.

It is understood that the Keephills plant is currently running the first production units on a trial basis.

TABLE 1

REPORTED AND PROJECTED COAL CONSUMPTION AND ASH PRODUCTION DATA
FOR GENERATING STATIONS IN OPERATION IN ALBERTA (1981 DATA)

UTILITY	STATION (LOCATION)	CAPACITY (MW)	YEAR	COAL TYPE*	COAL CONSUMPTION (10 ⁶ TONNES/YR.)	ASH PRODUCTION BOTTOM FLY ASH ASH (10 ³ TONNES/YR.)
Alberta Power Limited	Battle River G.S. (Forestburg)	737	1977	SB	1.1	59 72
			1978		1.2	56 82
			1979-2000		2.5	119 178
	H.R. Milner G.S. (Grand Cache)	150	1978	+	0.34	37 150
TransAlta Utilities Corp.	Sundance G.S. (80km west of Edmonton)	2100	1978	SB	4.9	219 511
			1979		6.0	270 631
			1980		6.7	301 702
			1981		7.3	328 765
	Wabamun G.S. (Wabamun)	582	1978	SB	1.4	63 146
			1979		1.1	50 117
			1980		1.5	68 158
			1981		1.5	68 158
			1982 (est)		1.9	85 200

* SB = Subbituminous coal

+ Tailings and rejects

TABLE 2

ESTIMATED FUEL USAGE AND COAL ASH PRODUCTION AT ALBERTA GENERATING
STATIONS PROJECTED TO COME INTO SERVICE AFTER DECEMBER 31st, 1981

UTILITY	STATION LOCATION	CAPACITY (MW)	YEAR	COAL TYPE*	COAL CONSUMPTION (10 ⁶ TONNES/YR.)	ASH PRODUCTION BOTTOM FLY ASH ASH (10 ³ TONNES/YR.)
Edmonton Power	Genesee	2700 by 1996	1986*	SB	-	- +
TransAlta Utilities	Keepphills	750 by 1985	1983	SB	1.1	50 115
			1984		2.5	112 262
			1985		2.7	121 283
Alberta Power	Sheerness	750 by 1986	1986	SB	3.3	318 219

* Data not available:

SB = Subbituminous coal.

2.1 Wabamun Generating Station

Wabamun Generating Station, operated by the TransAlta Utilities, has a capacity of 580 MW. The plant is used as an intermittent load station. Two generating units are employed, Unit #1 has been burning gas until a recent conversion to coal was made. Sub-bituminous coal is supplied from the Whitewood Mine (Manalta Coal Ltd.). Fly ash is collected by electrostatic precipitators and is dry-hauled as mine backfill. Some of the ash has been sold in the part by Trans Alta Fly Ash Ltd. for use in concrete. Two 45 gallon drums of fly ash were obtained from the Wabamun plant on April the 12th, 1983. This ash is typical of the material that would normally be supplied for use in concrete from the plant.

2.2 Sundance Generating Station

Trans Alta Utilities operates this 2,100 MW station located on the south east side of Lake Wabanum, close to Wabanum Provincial Park approximately 45 km west of Edmonton, Alberta. The plant is a base-load station comprising six units burning sub-bituminous coal from the Highvale Mine (Manalta Coal Ltd.).

Fly ash is collected from each unit by four field electrostatic precipitators. Ash from each field is transported by vacuum conveyor to silos from which it is discharged either for disposal or use. Ash for disposal is conditioned and trucked as mine backfill. Bottom ash, economizer ash and pulverizer rejects are separately discharged.

For the past 18 years, ash from Trans Alta Utilities generating stations has been marketed by TransAlta Fly Ash Ltd. (previously Western Fly Ash Ltd.). Recently a classifier has been installed by Trans Alta Fly Ash Ltd. at Sundance. Fly ash is taken from four of the six silos and air classified to reduce the + 325 mesh material. This ash is then sold to the concrete market. Two 45 gallon drums of classified ash were obtained on April 12th, 1983 by sampling from the storage silo used for collection of ash to be sold for use in concrete.

This ash is then sold to the concrete market. Two 45 gallon drums of classified ash were obtained on April 12th, 1983 by sampling from the storage silo used for collection of ash to be sold for use in concrete. This material is considered representative of the ash normally available from the Sundance plant.

2.3 Battle River Plant (Forestburg, Alberta)

Battle River Plant, operated by Alberta Power Corporation, comprises two generating stations:

Station 'A' - Units 1 and 2 (older units)

Station 'B' - Units 3, 4 and 5.

The plant burns sub-bituminous coal and has a generating capacity of 750 MW. Ash from Station 'A' is wet sluiced to lagoons and is of no interest with regard to use for concrete. Ash from Station 'B' is managed as follows:

Bottom ash, economizer ash, air heater ash and pulverizer rejects are wet discharged together, dewatered in hydro bins and disposed of as mine fill. Unit 3 has a conventional water quench bottom ash collection system, units 4 and 5 employ drag bar ash removal mechanisms.

Units 3, 4 and 5 employ electrostatic precipitators for fly ash collection. Units 3 and 4 use 4 row precipitators with low pressure discharge, unit 5 uses a 2 row precipitator, pressure discharged. Ash from all collection hoppers from the three Units is air-conveyed to a single silo from which it is taken either as 'conditioned ash' for disposal as mine fill or is sold for use in concrete.

Pozzolan International (Genstar) markets ash from Battle River. The ash is sold from the silo without classification. Quality control comprises determination of loss-on-ignition and fineness (by both wet-screen and alpine-sieve). The ash is sold to the ready-mixed concrete market including Consolidated Concrete Ltd. (also Genstar) in both Calgary and Edmonton. A large amount of ash was supplied in 1982 to B.C. Hydro for use at the Revelstoke dam construction site.

Two, 45 gallon drums of ash were taken from the silo on April 14th, 1983. This ash was from a batch tested for LOI and fineness and was considered to be of average quality and typical of the ash normally shipped for use in concrete.

